

right and left so as to make a flower which is markedly zygomorphic from a physiological standpoint.² In this connection it is now necessary to describe the stamens which are eight in number, four long and four short. The long stamens bear crimson anthers which open only by a pore beneath the terminal appendage. The four short stamens have white anthers that open their full length. Each and every filament has a tuft of hairs at the throat, so that there appears to be a ring of hairs at the throat. Below this in the cup, there is another ring of hairs, very well defined, but not so dense. This species has been studied at numerous stations in the field but the following notes were made in a colony on the upper San Benito River at the mouth of Lorenzo Creek.

This colony grew under a Blue Oak (*Quercus douglasii* H. & A.) tree where the steep slope was covered with leaf mold. The records were made in early June, 1927. Bees are now visiting the flowers. The bee alights on the protruding white style and the stamen cluster and hangs on by these organs. The petals, as said, spread right and left, and do not interfere with alighting on the flower from above or swinging the body freely downward. After establishing himself on the flower the bee feeds on the freely exposed pollen masses of the short white anthers, his body, with its hairy under surface, resting on the long stamens and brushing up pollen from the long crimson anthers. These anthers have the pollen so disposed that the bee could not easily feed upon it; but this pollen is evidently carried by the under parts of the bee to another flower where it is thrust directly against the stigmas of the protruding style which stands directly in the way of the insect visitor.

It seems a natural inference that the physiological irregularity in *Clarkia pulchella*, which I have noted as a widely spread phenomenon, is to be associated with the biological needs of the flower in relation to insects.

Berkeley, September, 1927,

FIELD NOTES ON CERTAIN BRODIAEA SPECIES IN HUMBOLDT COUNTY

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These notes concern my nos. 137 a, b and c, which is *Brodiaea congesta*, nos. 138 a, b and c, which is *B. venusta* and nos. 139 a, b and c, which is *B. ida-maia*, as observed by the writer in Humboldt County. These species are found growing within a few feet of each other, at the head of the South Fork of Yager Creek, just inside the fence on the west side of the road, a few hundred feet from the east gate of the Lamb ranch. The date is July 28, 1923.

Brodiaea ida-maia is very common through this region and far to the northward; *B. venusta* is quite uncommon and occurs, so far as I observe, only where *B. ida-maia* and *B. congesta* are near at hand. I find *B. venusta* at one particular spot where no *B. congesta*

² *Flora of Western Middle California*, 332 (1901), ed. 2, 277 (1911); *Man.* 673, fig. 660 (1925).

can be seen; this station is in the low ground along the creek where *B. congesta* is naturally to be expected, but where cattle had been pastured, and where (being late in the season) it might easily have been destroyed. *B. ida-maia* is found everywhere in this vicinity, not only in the low ground, but on the slopes of the hills on both sides of the creek valley and pretty well up towards the top; but *B. venusta* is only found in the richer ground along the creek and here only am I able to find *B. congesta*. Both *B. congesta* and *B. venusta* appear to be earlier than *B. ida-maia*.

Brodiaea venusta appears to me to be a hybrid, not merely because it grows only (in this locality) where the other species are found, but from a comparison of its morphological characters with those of *B. congesta* and *B. ida-maia*. This idea is, of course, tentative and could be discredited by finding it occurring in some locality where one or both of the others are not found. The seeds of *B. venusta* should be collected and grown.

Brodiaea stellaris is quite abundant at one place on the south side of Yager Creek. This spot has a northeastern exposure. I do not see it anywhere else. Mr. Joseph Tracy has, however, collected it a short distance east on the north side of the creek. The spot where it is plentiful (my station) is not more than 20 or 30 feet across, in a shaded situation and moist, clayey soil. I find these plants to differ in minor particulars from the formal description of *B. stellaris* as follows: (a) length of scape 6 to 12 in.; (b) corm spherical; (c) wings purple and as long as anthers (though not as high), strictly approximate, curved under at top, thus partly concealing stamens and stigma; (d) perianth segments not narrow.

Santa Rosa Junior College, 1923.

VARIATION IN THE PAPPUS OF *LAYIA PENTACHAETA* GRAY

WILLIS LINN JEPSON

The collection, which formed the basis of *Layia pentachaeta* was collected by Dr. J. M. Bigelow in May, 1854, at Knights Ferry on the Stanislaus River, Stanislaus County. The species was published by Asa Gray in the Pacific Railroad Report, volume 4, page 108, in 1857. There is an excellent plate (plate 16). The type is in the Gray Herbarium, and has been examined through the courtesy of the Curator, Dr. B. L. Robinson. Of the flowers belonging to the type which were examined, some fifteen, all showed five naked pappus bristles. On general morphologic and phylogenetic grounds one may consider five to be the ancestral number in this form. Variations from this number are indicated by the following specimens: (1) Simpson Ranch, Sweetwater Creek, Eldorado County, K. Brandegee; pappus bristles one to five, naked at base; in one head the variation was one, two, three, four. (2) Simpson Ranch, Sweetwater Creek, K. Brandegee, pappus bristles nearly always none; two flowers were found in separate heads, each having one naked awn about half as long as corolla. (3) Simpson Ranch, Sweetwater Creek, K. Brande-